Post-Doctoral Opportunity: Estuarine Sedimentation to Support Tidal Restoration, Cape Cod, Massachusetts

Position Description

The Herring River Restoration Project is being planned and will be undertaken by a partnership comprised of the Town of Wellfleet, Massachusetts; Cape Cod National Seashore; several other federal and state agencies and local advocacy groups. Restoration of tidal influence to the Herring River through the replacement of tidally restrictive flow structures is expected to promote reestablishment of hundreds of acres of inter-tidal salt marsh and associated habitats and ecological functions. However, there are several concerns about uncertain outcomes and potential unintended consequences. Among these are changes to sediment transport and nutrient flows that may negatively impact local resources. Potential impacts to the abundant and financially valuable aquaculture operations in the receiving waters of Wellfleet Harbor are a particular concern. Development and implementation of rigorous, science-based monitoring protocols are needed to fully understand and document the pre-restoration baseline conditions and to support meaningful projections of future conditions with the Herring River undergoing tidal restoration. Data and analyses derived from this study will also be incorporated into the project's detailed, quantitative decision-analysis process and adaptive management plan. Detailed information about the Herring River Project can be found at http://www.friendsofherringriver.org

In order to better understand the pre-restoration, baseline sediment transport and sediment-related water quality linkages between the Herring River and Wellfleet Harbor, the University of Massachusetts, Boston (UMB) is seeking a post-doctoral (PD) researcher for a 3-year term. The successful candidate will sit in the Hiebert Marine Lab at the Center for Coastal Studies (CCS) in Provincetown, MA, a short drive away from the field site. The University and Center share a joint research lab with facilities in Provincetown and Boston. The primary focus is study design, implementation, and deployment of field instrumentation and other data collection that will quantitatively capture the processes that drive fine-grained (suspended load and bedload) sediment transport between the river and the harbor.

The goals of this effort are to:
1) fully describe and document the existing, pre-restoration baseline seasonal and annual variation of sediment flows and hydrogeomorphic processes between the river and the harbor;
2) develop detailed hydrogeomorphic monitoring protocols and study plans for future monitoring and research as the restoration project is implemented. Depending on the specific interests of the PD and alignment with the project's priorities, support for continuing or expanding upon the PD's primary research activities may be supported.

In addition to the core goals described above, the PD will assist UMB/CCS staff and other local scientists from the Herring River project team on routine and special monitoring activities. These may include, but are not limited to, field collection and lab processing of water quality samples; calibration, maintenance, and data management for several automated field data collection systems; field collection, lab processing, and data management for surface and sub-surface sediment cores; development of spatial data sets using real-time kinematic global positioning

systems, total station, and other ground survey methods; spatial data analysis, data management, image and remote sensing data analysis, and map production using geographic information system software and methods. The PD will be required to present findings from their work at local or regional conferences and will be strongly encouraged and supported to publish in the peer-reviewed literature as results warrant. The post-doc will work closely with the project team, attend quarterly meetings and others as needed. They will liaise between the project team, CCS, the Seashore, the University and the USGS as needed.

This position is based at the CCS Hiebert Marine Laboratory in Provincetown, MA. This is a fully funded full-time position with benefits for a 3-year appointment. Extension of the position beyond the 3-year term is anticipated, pending future funding and project needs. A rough breakdown of work-related duties is 40% field, 30% lab, 20% data entry/management and 10% other duties as assigned. The PD will be guided by a post-doctoral review committee comprised of the primary CCS supervisor and staff from Cape Cod National Seashore, the Herring River project team, the University of Massachusetts-Boston, and the USGS at Woods Hole.

Duties and projects include:

- Setup and maintenance of field instrumentation, data collection and field research activities, as well as processing and analyzing samples and data in the laboratory.
- Involvement in both the field and laboratory for the Herring River monitoring program and applied research to inform the Herring River Adaptive Management Plan.
- Perform laboratory analysis and written documentation of field sampling.
- Perform routine maintenance, data acquisition, troubleshooting, and data management for automated/continuous samplers and data loggers.
- Collect and process wetland sediment samples; use field GPS and other survey equipment to acquire three-dimensional survey data.
- Use GIS for spatial data processing/management, data analysis, and basic map preparation.
- Field duties will involve some wading in muddy and shrubby conditions.
- Data management, analysis, and presentation, including formal reports, research papers, and oral presentations at local forums and professional meetings.

Qualifications: The ideal applicant for the position will hold a Phd degree in a relevant field such as ecology, marine biology, botany, wildlife sciences, biology, coastal geology, or related disciplines. Exceptionally qualified PhD candidates (ABD) may be considered.

Required Experience:

- Experience with coastal sediment transport processes (particularly non-cohesive fine-grain sediment dynamics in a semi-diurnal tidal environment) and related data collection and instrumentation.
- Must be able to communicate clearly and concisely in English, both verbally and in writing
- Must be able to complete tasks well, independently, and on a team

- Physically able to work outdoors for up to 8 hours per day, traversing/paddling and carrying equipment weighing up to 50 lbs. in extreme hot and cold weather conditions over rough terrain
- Must have a valid driver's license

Preferred Experience:

- Experience with wave and current data collection, instrumentation and analysis (ADCP, ADV, etc.).
- Experience with hydrodynamic, sediment, and/or ecosystem modeling or related quantitative simulation of hydrogeomorphic dynamics in a semi-diurnal tidal environment.
- Experience/training in shellfish aquaculture and/or assessment of shellfish habitats.
- Engineering and/or mechanical experience related to installation, operation, and maintenance of environmental monitoring equipment and systems in coastal habitats.
- Experience in physical, chemical, and biological laboratory analysis of water and coastal sediments.
- Experience with GPS and GIS for spatial data acquisition, analysis, and presentation.
- Excellent data analysis, writing for technical and popular publications, and oral presentation skills.

The Center for Coastal Studies will host the successful candidate at the Hiebert Marine Lab in Provincetown, Massachusetts. Approximately 50 miles from Hyannis, and 120 miles from Boston. Small residential communities in the area provide basic amenities, including grocery and specialty shops, medical services, libraries, and schools at the elementary, middle, and high school levels. A hospital, shopping malls, and Cape Cod Community College are located in Hyannis. The Outer Cape has abundant cultural and outdoor activities, including community theaters, art galleries, museums, music, whale-watching, fishing, bird watching, swimming, and boating. Airline and ferry service between Boston and Provincetown are available. Private rentals in the community are comparably priced, but year 'round rentals are often difficult to obtain. Homes are available for purchase in all nearby communities; purchase prices are considered high. A public bus system exists in the area but relying on it for daily commuting may be inconvenient.

- Housing assistance may be available

- To apply, send CV, Letter of Interest, references, and writing sample to:

  Post-Doc Review Committee
  Center for Coastal Studies, Hiebert Marine Lab
  5 Holway Ave., Provincetown, MA 02657

  Or by email to: mark.borrelli@umb.edu
  Cc: mborrelli@coastalstudies.org

- Applications are due no later than close of business June 19 2020.